



Early Journal Content on JSTOR, Free to Anyone in the World

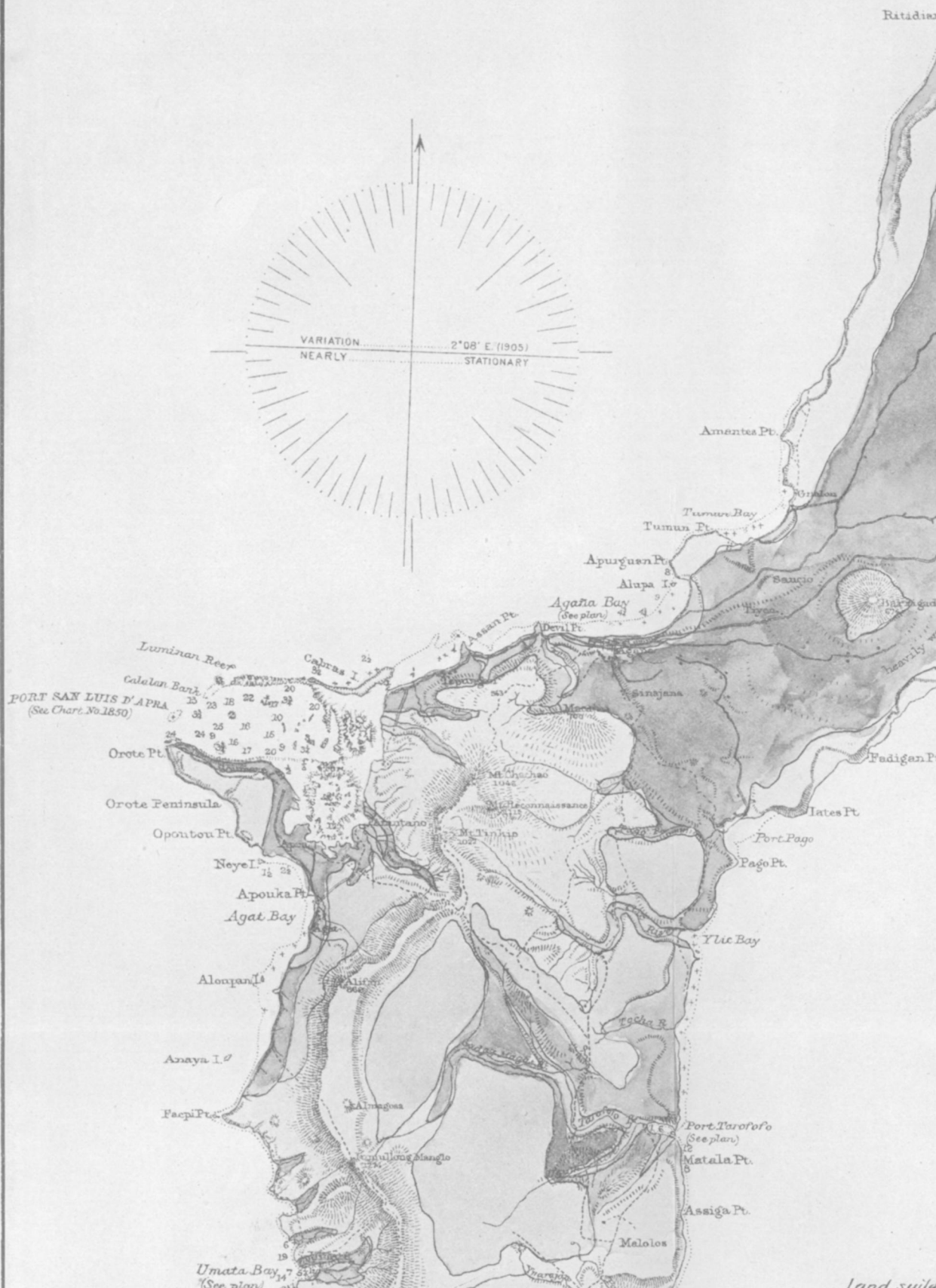
This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.





land suitable for cultivation



Land suitable
1st Grade, best for
2nd " Suitable
Pasture land for
Unsuitable for Cattle
Trails fit for bull carts
" " " pedes



BULLETIN
OF THE
AMERICAN GEOGRAPHICAL SOCIETY.

Vol. XXXVI

1904.

No. 7

THE ISLAND OF GUAM.

BY

CIVIL ENGINEER LEONARD M. COX, U. S. N.

Guam is the largest, most populous, and most southern in position of the Mariana Islands, a group which trends almost north and south along the 145th meridian east from Greenwich, and between the 13th and 20th parallels of latitude, a distance of some 450 miles. The island is thirty miles in extreme length, and averages six and a half in width. It lies with its length nearly north and south, and is 207 square miles in area.

The southern part of the island is high and mountainous. A chain or ridge of hills, ranging in altitude from 700 to 1,300 feet, begins near the bay of Pago, and, extending to the west coast near Agaña, follows that coast to the extreme southern end of the island. The slope of the mountains is very steep to the westward; while towards the east it is gradual, and forms elevated plateaux, which terminate in abrupt bluffs on the eastern coast-line. These plateaux are broken by valleys of five streams, with their numerous tributaries, which, making their beginning near the top of the ridge, cross almost the whole width of the island to the sea on the east. The slope towards the west merges into low foothills some little distance from the sea, leaving a belt of rolling lowlands, valuable for cultivation or pasturage. From Agaña southward the coast is indented by numerous little bights or bays, lined by narrow strips of beach land, which are cultivated to a greater or less extent. Coconut groves are planted near the sea, together with patches of maize, taro, and camotes, the garden truck of the Chamorros, while here and there rice is growing where a small stream furnishes a swampy bottom.

The highest land on the island is in the southern part, and Mt. Jumullong Mangloc, which lies just east of the village of Umatac, attains an elevation of 1,274 feet above the sea. Mt. Itao forms the southern prominence, and is 1,100 feet high; while Tenjo, at the head of the bay of Apra, reaches an elevation of 1,080 feet, and makes a convenient landmark for vessels. The mountains, as a rule, are bare of vegetation, with the exception of stunted shrubs and grasses. The highest plateaux or mesetas are covered by "cogon" or sword grass, and the valleys are heavily wooded.

The topography of the northern half of the island is entirely



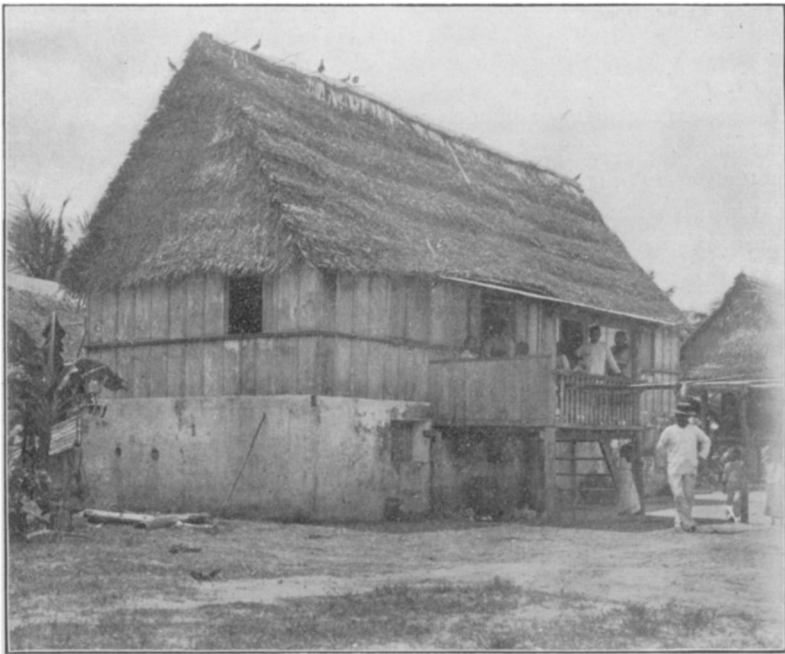
COCOANUT GROVE.

Trees on the left 3 years old; those in the middle 6 years; those on the right 10 and 15 years old.

different from that of the southern, inasmuch as it is one large plateau, ranging in elevation from 300 to 600 feet. The land slopes gently upward from the interior to the sea, where it terminates in abrupt headlands and steep bluffs. This part of the island contains no rivers, and the few inhabitants depend entirely upon the rainfall. The only elevation of any prominence is Mt. Santa Rosa, 840 feet above the sea. The coast-line from Agaña around the northern end of the island to Pago Bay presents a forbidding appearance with its nearly vertical cliffs from 350 to 650 feet in height. On the northern exposure the curving coast-line

encloses strips of valuable beach land, and wherever such strips exist, between the bluffs and the water, there are thickly-planted groves of cocoanut trees. The eastern exposure of the northern part, like that of the southern, is precipitous, dropping abruptly into the sea, with the reef lying so close that the waves, in stormy weather, break directly against the cliffs. The only beach land of any consequence along the whole of the eastern exposure is between the mouths of the Ilic and Tarofoto Rivers, in the southern part of the island.

It would appear that the mountain chain extending through the



TYPICAL PLANK HOUSE.

southern part of the island was thrown up by volcanic action in some remote geologic period, and that originally only this ridge and a very small part of Santa Rosa were above water. The conditions being favourable, the formation of coral reefs was begun which, together with alternate elevations and subsidences of the earth, have brought the island to its present state.

Guam possesses no known mineral wealth. Fragments of a heavy iron ore are found in the neighbourhood of Ilic Point, which resembles hematite in colour and weight, but it is not known that a

continuous vein exists. There is a tradition that coal is found on the islands, and that some years ago several tons were mined and tested on one of the Spanish steamers which formerly plied between Guam and Manila. This coal cannot now be found, and it is believed that the story is based on the existence of thin pockets of recent lignite found on the eastern slopes of the mountains. Gypsum is reported to exist on the island, but in what grade or quantity is not known.

There is very little heavy stone suitable for construction purposes, and the little that does exist is in inaccessible locations. A thick ledge of pale blue limestone crops out from the foothills near Agaña, which is quarried for use. It is a fine-grained, homogeneous stone, of specific gravity 2.5, weathers well, and is easily cut. Two grades of lime are manufactured on the island—one from the green coral taken directly from the reef, the other, called by the natives "Ayuyo," from limestone found in the hills. The latter grade only is used for building purposes by the Americans. Cascajo, or the disintegrated coral earth, which forms the body of the bluffs in some parts, is very valuable for road construction.

Nearly the whole of the northern meseta and the valleys of the rivers in the south are heavily wooded and contain considerable quantities of valuable hard woods. Omitting all species of lesser value, it is estimated that there are 20,000,000 feet of commercial Ifil, 15,000,000 feet of Palo Maria, and 10,000,000 feet of Chopag, which, at the present island price of \$45 per 1,000 feet, would make the value of the timber, at the very least, \$2,000,000. The timber should, however, be reserved for island purposes and permission to cut should be withheld. Besides Ifil (*Eperua decandra*), Palo Maria (*Calophyllum inophyllum*), and Chopag (unknown) there are various other woods of value which are not produced in sufficient quantities to be reckoned among the resources, such as Balibago (*Hibiscus tiliaceus*), Ajgao (Spanish name, *Molave*; scientific, *Vitex geniculata*), Mangle, Limoncito, the Bread-fruits, and numerous other species, of which the native name only is known.

The natural history of Guam is sufficiently well known to render unnecessary its introduction in a paper of this scope, but it may be stated in passing that there are on the island in the neighbourhood of 1,000 head of cattle, the same number of carabao, about 40 horses, and sufficient hogs, chickens, ducks, etc., for the use of the natives. In addition to domestic animals and fowls, there is an abundance of game in the way of deer, wild hogs and goats (originally domestic), duck, curlew, snipe, and pigeon. There are

numerous varieties of edible fish in the coral shallows; while sea turtle and crayfish may be caught in certain seasons of the year. There are no reptiles on the island except lizards, of which there are many varieties. Mosquitoes, centipedes, and occasional scorpions are to be met with, but the stings of the last named are not dangerous.

The climate of Guam is healthy, and, on the whole, pleasant. The northeast trades prevail for six months of the year, during which there is little rain. From June to the middle of December the monsoon blows, and its warm winds, striking the tops of the



STREET IN AGAÑA : STONE HOUSES.

hills, cause precipitation, and give rise to the so-called rainy season. During the year ending February 15th, 1902, the rainfall amounted to 102 inches, of which 60% fell during the rainy months. The greatest fall in any one day during the year 1901-2 was 6 inches, and the most prolonged drouth three weeks. The mean annual temperature is about 81°, and it is almost constant. There is always a pleasant breeze, and one can be quite comfortable when protected from the direct rays of the sun.

At intervals the island is visited by severe typhoons, which cause much loss of property and sometimes loss of life. One of the most disastrous in the memory of the inhabitants occurred November

13th, 1900, and destroyed all crops, fruits, and many of the wooden houses. As in the Philippines, earthquakes are of common occurrence, but prior to the recent severe shock of September, 1902, they had not for a long time been considered alarming.

The earliest accounts of the natives of Guam are found in the records of the old navigators and the Jesuit missionaries, who established the first mission in 1668. According to these reports, the original Chamorros were a fine race physically—athletic and warlike. They were good sailors and fishermen, and had some knowledge of the art of building. The island was thickly dotted with their villages, and the population was estimated at about 50,000 for the whole group—an estimate which does not seem so far wrong when it is considered that the ruins of their houses are found to-day in every part of the country. No attempt at colonising was made until the year 1668, one hundred and forty-seven years after the discovery by Magellan. The principal village at that time was called Jagatna, and was on the present site of Agaña. Spanish civilization and the methods used in converting them were distasteful to the natives, and the history of the first twenty years of the mission is a story of continual warfare, replete with murders, massacres, and treachery on both sides. Spanish conquest was finally complete, and a colonial form of government was established, which continued with but little change to the date of American occupation in 1898.

The population of the island is about 10,000, of which number 60% resides in the City of Agaña. Other towns in the order of their size and importance are Soume, Agat, Merizo, Inarajan, Umatac, Piti, and Sinajaña, ranging in population from 650 to 150.

Social lines are rigidly drawn in Guam, and family has all the significance that it has in the oldest countries. The wealthiest class resides in Agaña, though all, or nearly all, own ranches, and depend upon their income for maintenance. Spanish officers assigned to the Philippines often married native women, and to-day in Guam the names of the "four hundred" include the family names of nearly every governor of the past two centuries.

Of the natives the men are short in stature, but well formed and strong in the legs. They have great endurance, but not much strength in the arms and back, and are not good at lifting weights or striking hard blows. They can walk great distances in the hot sun and carry quite heavy burdens. The women are well formed, very erect in carriage, and almost without exception have beautiful black hair, of which they take great care and are very proud.

The solid citizen of the upper class lives well, and enjoys such luxuries as he is able to obtain from the Japanese traders. He wears white drill clothing, the coat of which has a standing military collar, is cut like a white shirt, and worn on the outside of his trousers. He wears half slippers, without socks, and a straw hat. His wife and daughters are housekeepers and good cooks. Their dress consists of a full skirt of fine muslin or silk, and a zouave of delicate white embroidered material, low necked and with flowing sleeves. Since the American occupation a number of the young women have adopted our style of dress—an innovation which does not greatly add to their attractiveness. The men and women of this class do not use the betel nut, nor do the women smoke.

In town, the costume of the labouring class differs from that of its well-to-do neighbours only in the quality of material. The same style of shirt is worn on the outside of the trousers, and on Sunday a pair of half slippers is added. In the country the labourer wears a sandal made of a leather or fibre sole-piece held by a thong, which passes over the instep, around the heel, and between the toes. The women of the poorer class wear on feast days or Sundays a long, trailing skirt of brilliantly-coloured calico and a white muslin zouave over a short chemise. On their heads they wear a folded handkerchief of cheap quality. On working days their dress is of the same style, but older and much dirtier, with the train of the skirt tucked in the belt. They wear no stockings, and discard even the half slippers when indoors. At their ranches they tuck the skirt up above the knees and do all the harder kinds of labour with the freedom and ease of a man.

The impression has gained ground that the Chamorro is lazy; but such is not the case, in my opinion. It is hard to induce one of them to work for wages, but the reason is apparent; he needs money only for the purpose of paying his taxes. There are few things he can buy beyond rice during famine times—a little sugar now and then as a luxury, and a plug of tobacco as a great extravagance. If he works for wages it is partly a matter of accommodation, and he will not continue longer than a week, as he then has to go on his ranch to obtain enough for his family to live on during the working period. He may be less intelligent than the Tagalo, but he is a peaceful, good-natured, and law-abiding citizen, industrious in his own way and on his own work; he is clannish to the point of protecting miscreants from the law, even when he himself is the victim of the wrongdoing. He is slow to make friends, and a little suspicious of advances, but once having formed a

friendship he is staunch and true. After two years' experience in handling Chamorro labourers, no instance is recalled of a single direct falsehood, though instances of promises made and not fulfilled were frequent. The Chamorro is a devout Catholic, and every act of his daily life is regulated by his religion.

The rancher will never make a business success until he abandons his present practice of living in town and running out to his ranch on working days. This custom owes its origin to two causes: first, to the fact that the early Spaniards made it compulsory to live in



TYPICAL RANCH HOUSE.

the vicinity of a church (it was much easier in that way to collect taxes); and second, it was important to be near a water supply. All through the southern half of the island water is accessible, and in the northern part there are few places where wells could not be successfully driven, but the church will continue to be the obstacle in the way of a change until better and more roads are constructed from ranch districts to neighbouring villages. If a ranch is within an hour's walk of the town, its owner will spend two hours of his day on the road to and from his work; if at a greater distance, he will remain on his ranch for a day or two, and

sometimes for even a week, but will never fail to reach the village in time for the Saturday afternoon cockfight and for church Sunday morning and evening.

The approximate area of land under cultivation at present, as determined during the progress of the recent survey, is as follows:

Area of first-class cocoanut land.....	3	sq. m.
“ “ meseta “ “	2	“
“ “ maize, camotes, and garden truck...	1	“
“ “ rice.....	0.70	“
“ “ coffee.....	0.17	“
“ “ sugar....	0.15	“
“ “ cacao	0.08	“
<hr/>		
Total.....	7.10	“

When it is taken into consideration that the area allotted to cocoanuts in the above includes all cleared lands where the trees are growing, with no matter what degree of cultivation, and that the other products, rice and sugar alone excepted, are produced on the same land, it may be said that less than 3% of the total area of the island is under cultivation to-day.

Of the products of the island, by far the most valuable is that taken from the cocoanut tree, and after come, in the order of importance, rice, sugar, coffee, and cacao. Maize and camotes (sweet potatoes) are not grown for sale, each ranch planting just enough for its own needs. The amount of rice that can be produced is limited by the acreage of swamp land, nearly all of which is at present cultivated. Sugar, coffee, and cacao can never become important sources of wealth, because of the outlay of capital and the labour required for their production.

Some idea of the importance of the copra trade may be obtained when it is understood that little labour is necessary either for the cultivation of the trees or in the preparation of the product for the market; that from 3 to 4 tons of prepared copra can be produced per acre of good land; and that there is in it a profit of from \$10.00 to \$20.00 net per ton. A complete account of the copra industry would be interesting in connection with any information concerning the Island of Guam, but the limits of this article do not permit more than the brief statement that the entire movement in copra for the year 1901 amounted, approximately, to \$18,000,000; that the price in any year of the last twenty has never fallen below that of the preceding year; and that the principal markets are Hamburg, Edinburgh, Marseilles, Hong Kong, and Yokohama.

It is estimated that at least 40% of the area of the island, or 80 square miles, is suitable for the cultivation of the cocoanut, and the manner of cultivation is such that the same land may at the same time be made to produce all of the other native crops, with the exception of rice and sugar. At \$40.00 net profit per acre (a conservative estimate) Guam, under favourable conditions, might attain an income of \$2,000,000 per annum. If anything like these results were ever obtained it seems reasonable to predict that a market for copra would be established at San Francisco, a small commerce built up with Yokohama and Manila, and possibly the whole of the south and central Pacific island trade be controlled by American interests centring in Guam.



RESULT OF THE EARTHQUAKE SEPT. 22, 1902.

Under Spanish administration the Marianas were governed by an officer of the army or navy, who held the title of Governor, and who was subordinate to the Governor-General of the Philippines. The powers of the executive were limited, and any act of his was subject to approval of the Philippine authorities, who in turn were governed by defined laws. All capital cases were subject to review by the Court of Cassation in Manila. The expenses of the insular government were largely borne by Crown appropriations, and the funds for the public schools were derived from the same source. A line of steamships was subsidized to maintain communication with

Manila at intervals of about two months. Taxes were nominal, and did not furnish more than about 15% of the amount annually expended, of which by far the greater part was derived from import duties.

Under American administration the natives have greatly benefited by examples set in matters of honesty in office, sanitary modes of living, and habits of industry; but in more material matters it must be admitted that in many ways the comparison is not in our favour. Among facts that might be cited in support of this assertion are: (1) Lack of Federal aid for the expenses of the insular government and for public works, notwithstanding the fact that the island has never been self-supporting since it was first brought under the influences of civilization; (2) failure to provide a code of laws and to limit the powers of the executive, whose orders, issued from time to time, have all the effect of statute law; (3) failure to define permanently and clearly personal and property rights; (4) failure to provide funds for schools, on account of which failure the only schools on the island to-day are mere classes taught by the Spanish friars in the Spanish language (formerly there were schools in every town and village, besides a college in Agaña, endowed by a Spanish sovereign); (5) failure to provide for transportation and mail facilities.

Under Spanish administration the more ambitious natives were educated in Manila, or even in Spain; while to-day an education of any sort is denied them, and in trade they are at the mercy of Japanese trading schooners. It is also true that while wages under American administration have advanced almost four-fold, the prices of commodities have more than correspondingly advanced, and it is, on the whole, harder for the native to earn a living to-day than in former times.

It is believed that only a fuller knowledge of these conditions is needed in order to arouse interest in this our smallest possession; interest not only on the part of the Government, which is sure to manifest itself in time, but on the part of private philanthropy as well, which can find nowhere a field of investment that will give more rapid and more positive results than on the Island of Guam.